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review essay

Mapping biocapital: new frontiers of bioprospecting

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When nature goes public: the making and unmaking of bioprospecting in Mexico. By Cori Hayden. Princeton: Princeton University Press. 2003. 312 pp. \$57.50 cloth; \$18.95 paper. ISBN 0 691 09556 6, cloth; 0 691 09557 4 paper.

Trading the genome: investigating the commodification of bio-information. By Bronwyn Parry. New York: Columbia University Press. 2004. 352 pp. \$41.50 cloth. ISBN 0 231 12174 1.

In the context of increasing attention by world leaders to 'debt for equity' exchanges, and economic restructuring that will both repair and redress the increasing stratification of world trade, two questions become especially prominent: how can past exploitations be repaid, and how can their reproduction be prevented in the future? As argued in a recent Channel Four documentary, 'The empire pays back', a considerable proportion of the wealth and wealth accumulating enterprises which account for the global economic privilege enjoyed by modern nations such as Britain derive, historically, from vast appropriations of resources, often from tropical, colonial territories. A major worry in the context of the new 'bio-economies' of the post-genomic 'race' to gain global market shares in new industries such as recombinant DNA technologies is whether yet another chapter in the 'voyages of discovery' genre is already under way.

These themes have been explored at a very general level in popular recent books such as Patricia Fara's *Sex, botany and empire*, which revisits the work of scientists such as Joseph Banks as essentially entrepreneurial.¹ Similarly, Richard Drayton's historical account of what he names the 'agrarian view of empire' demonstrates the often under-appreciated significance of agricultural technology and engineering to

early definitions of 'bio-wealth'.² These accounts, alongside Londa Schiebinger's *Plants and empire*,³ chart a kind of 'hidden history' of resource extraction, often described as 'bioprospecting'.

It is therefore highly significant that Bronwyn Parry's *Trading the genome* and Cori Hayden's *When nature goes public* bring the debate about biological extraction into the contemporary frame, through detailed empirical studies of how new 'biologicals' are being stabilized, denominated, stored, accumulated, distributed and turned into new forms of property. Indeed, if one of the most important contemporary questions of political geography is that of how the biological is being given new form, then these two books are critical places to look both for how to research this question and, in part, for how to answer it.

Cori Hayden's anthropological monograph takes us on a tour of Mexico, where for 18 months she conducted ethnographic fieldwork in the nature-culture of the new biologicals, that is, in pursuit of patentable biodiversity, or commercially viable biological action, or simply indigenous biowealth. Following this ethno-botanical action around takes us to unexpected places – to remote markets in Northern Mexico filled with savvy vendors of dried *yerbas* – *yerba de la vibora*, *yerba del zorillo*, *yerba del conejo*. Frequently on the move, Hayden's research took her to artisans' collectives where the agave cactus is pit-roasted to make mescal, and up dry *arroyos* to hidden ranch-houses in old copper mines to find the old and new natures being forged out of indigenous knowledge and native plant resources. She also spent time in museums and in laboratories, and went shopping at traditional Mexican markets, as well as collecting samples along roadsides and in 'disturbed areas' burnt by forest fires, always accompanying her ethnobotanical *biologos* on their quest to discover new sources of potentially marketable biocapital. Her clippers never far from her hand, she gets all mixed up in the complicated business of botanical bioprospecting and the elusive quest to find 'isolated compounds that ostensibly can be shown to have discrete kinds of efficacy' (p. 194). For Hayden, all of this movement is a crucial indicator that plant resources must be made, as well as found: by being given new kinds of 'connection' a bioactive plant extract can be reanimated as a commercial product.

As Hayden notes in her superb overview of debates about patenting 'life itself', these movements and mixtures are what define the geography of bioprospecting, hybridizing scientific and indigenous knowledges, abstract nomenclature and venture capital, and 'bioactivities' with the technologies that can extract them. After all, property is always a mixture: a containment strategy 'sutured together', to use a phrase Hayden returns to as a refrain throughout, out of legal entitlements, individual identities, national constitutions and conceptual legacies. Property is itself the product of a paradoxical process, a reification which must be as fluid as it must be stable – a bit like the biological itself.

The fluidity, but intractability, both of the biological and its properties and of the power that is needed to give these a stable economic shape, is the idea that unites both of these books, which each offer timely and insightful analyses of the contested relationship between biological collection and its commodification. Bronwyn Parry's economic geography of biological trade begins in the unlikely location of Frederick, Maryland, at the Natural Products Repository of the US National Cancer Institute. Here,

in 'a wholly unremarkable brown warehouse' in a rural backwater are stored more than 50 000 different samples of plants, animals, fungi and other organisms, from whole frozen starfish to yew leaves in what Parry calls 'a technoscientific ark'. From here she takes us on an extraordinary tour, from the history of the New World voyages and their mania for collection to the molecularization of the activity of bio-assays, which can now be used to screen vast quantities of materials for their bio-activity levels at unprecedented speed.

This tour ranges from the early 'gatherings of nature' by herbalists and apothecaries to the New World 'voyages of discovery' and their accumulations in the form of early biobanks such as Kew Gardens. As Parry points out, even these early biological collections were also 'centres for calculation' in their function as classifying and taxonomizing hubs of imperial expansion. She argues that while contemporary collecting by museums, universities and corporate research institutes have much in common with these legacies, they are also different, in that the role of the 'genetic software' has come to be as important an informatic repository of biodiversity as the sample itself, thus spawning a whole new genre of 'proxies' which are promiscuously mobile and easy to replicate.

It is in this way, empirically and theoretically explored in both these path-breaking books, that we see a transformation of both kind and degree in the nature of biobanking. This, of course, has huge implications, not only because of the changes in scale that Bronwyn Parry demonstrates in her account of how the genomes of plants, animals and micro-organisms are now transformable and transactable in ways that were heretofore unimaginable, but because, as she points out, biobanking is increasingly directed at human DNA, human tissue, human embryos and human stem cells.

This means we are very much in need of the kinds of vocabulary these two books begin to forge in what might be described as the vacuum of current public debate about biobanking (cf. the recent anthology edited by Richard Tutton and Oonagh Corrigan⁴). For Cori Hayden, following the biological action in the world of bioprospecting can usefully be seen in terms of what she describes as 'unexpected webs of accountability'. As both Hayden and Parry show, most of the biologically desirable resources are in the economically deprived south, now, as in the past, the source of most of the world's valuable 'tropilogicals'. But, as both authors also discuss in depth, the efforts made by many countries, governments and NGOs, through conventions, treaties, corporate policies and local governance, to benefit share are much more easily agreed in principle than they are to carry out.

In fact, one of the most important scholarly and intellectual legacies of these two books put together is their combined diagnosis of what is wrong with the idea of benefit sharing, and why – despite the fact that everyone agrees with the principle of reciprocity enshrined in documents such as the 1992 UN Convention on Biological Diversity – there is very little evidence of actual economic result.

For Hayden, the problem is, not inaccurately, described as hedging. All of the intentions, ethical commitments and promises are hedged with ambivalence and uncertainty. The simple principle of taking being reciprocated by giving back becomes so disaggregated across such complicated networks of what she calls 'multilateral

expectations' and 'multidirectional forms of exchange' that their intentions are lost in a miasma of dispersed responsibility and delayed obligation.

Thus, for Hayden, a key term is 'interest' – who is interested, who has an interest, and what is biologically 'interesting'? This interest, she notes, never comes without attachments – and it is the attachments that are the hedge, the hedging, the semi-permeable, ubiquitous barrier that, as in Raymond Williams's famous description of British hedgerows,⁵ simultaneously display and obscure the industries of rural settlement.

For Parry, an important remedy can be found in the form of duty – both in the moral and financial sense, indeed, where they meet. While some already powerful national economies are in a position to capitalize on what she calls the 'brave new bio-informational economy', others are not, and this is how age-old inequalities based on being bio-rich and bio-poor will once again be widened through the process of 're-mining' of the biological as the informatic. Hence, while it is reported that pharmaceutical companies are estimated to earn between \$75 and \$150 billion annually from natural materials sourced primarily from developing countries, none of these countries has ever received any significant redistributed income from these markets.

A duty, or levy, on all products sourced in this way of 3 to 5 per cent would clearly reverse such a tendency, and would avoid the baroque complexity of product traceability exhaustively documented by both of these books, and ultimately diagnosed by them as chronically infirm. Such simple solutions are surely within reach of a society capable of mapping the human genome and reproducing it on a CD. On the other hand, these books both demonstrate the depth of conflict between the drive to accumulate wealth and the desire to distribute it more equitably. Appearing at a crucial moment when the effort to repay past debts is at a high point of public visibility, and yet another round of 'bio-extraction' is already under way, these two books offer invaluable perspectives that reveal the making of biowealth from the inside out.

Notes

¹ P. Fara, *Sex, botany and empire* (Thriplow, Cambridge, Icon Books, 2004).

² R. Drayton, *Nature's government: science, British imperialism and the improvement of the world* (New Haven, CT, Yale University Press, 2000).

³ L. Schiebinger, *Plants and empire: colonial bioprospecting in the Atlantic world* (Cambridge, MA, Harvard University Press, 2004).

⁴ R. Tutton and O. Corrigan, eds, *Genetic databases: socio-ethical issues in the collection and use of DNA* (London, Routledge, 2004).

⁵ R. Williams, *The country and the city* (Oxford, Oxford University Press, 1974).